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January 31, 2003

Mrs. Rita Brooks
Vicksburg Consolidated Contracting Office
2902 Newmark Drive
Champaign, IL 61822-1076

VIA E-MAIL: r-brooks@cecer.army.mil

Subject: Midpoint Project Status Report, Southwest Research Institute® Project 03-05118,
“Demonstration of PEM Fuel Cells in Military Residential Facilities,” Contract
No. DACA42-01-R-0024

Dear Mrs. Brooks:

The following is a MidPoint Project Status Report, for Southwest Research Institute®
(SwRI®) Project No. 03-05118.

1.0 SITE

The demonstration site is base housing located at Brooks City Base in San Antonio, Texas. Figure 1.1, Base Housing at Brooks City Base, is a photograph of one of our housing units. The fuel cells are in the far right background of the photograph.



Figure 1.1 Base Housing at Brooks City Base



SAN ANTONIO, TEXAS

HOUSTON, TEXAS • DETROIT, MICHIGAN • WASHINGTON, DC

The specific housing units, size and street address are shown in Table 1.2. Brooks Housing Units, Size and Address.

Table 1.2 Brooks Housing Units, Size and Address

Building 493	1467 Square Feet	111 Vinsant Circle
Building 494	1524 Square Feet	109 Vinsant Circle
Building 495	1524 Square Feet	107 Vinsant Circle

These housing units were identified in coordination with U.S. Air Force personnel and were chosen on the basis of good rear access to the residences (to minimize installation disruption to the tenants), proximity to gas and electric utilities, easy site access for servicing and possible tours, and park-like setting for public relation events. Primary contact for the U.S. Air Force at Brooks is Steven Holt, (210) 536-5015.

Figure 1.3 Fuel Cells Installed On Pad, depicts the Plug Power Fuel Cells as installed on our 35 foot by 35 foot fenced pad behind the residences.



Figure 1.3 Fuel Cells Installed On Pad

The site was designed by San Antonio City Public Service (CPS) our local gas and electric utility in San Antonio. Detailed site plans are available but are not included in this midpoint report. CPS is our partner in this demonstration and supplied site design, permitting, installation and maintenance. CPS obtained all the required permits and inspections on the site including air quality, drainage, water plumbing inspection, tree ordinance compliance, City of San Antonio plan review, and fire marshal review. Permitting actually slowed the project by approximately 2 months. The site incorporates a buried ground wire arrangement that is

connected to a 7-foot high fence that surrounds our pad. The grounding grid is designed to help dissipate any lightning strike as well as to make it impossible for any shorts to electrify the fence. The fence provides security for the fuel cell and switch equipment and is kept locked. CPS created a short asphalt road to the 35-foot by 35-foot asphalt covered pad from Bedwell Street. The drive and site are depicted in Figure 1.4, Road to Site. CPS provides 110 and 240 VAC power at the site for maintenance activities and lighting. The site is equipped with two floodlights in the event that maintenance is required during the night. We have promised the neighbors not to utilize the lights unless we are working on the units at night.



Figure 1.4 Road to Site

CPS installed General Electric KV-2 electric meters to monitor the power output of each fuel cell and to monitor the power used by each house. CPS tapped a nearby gas line and installed a gas meter on each fuel cell. Both the electric and gas meters are read electronically by computers installed in a data acquisition box. SwRI contracted with Connected Energy Inc. to install data gathering equipment to monitor fuel cells and meters.

The Plug Power units require a source of deionized (DI) water. SwRI entered into a 14-month lease agreement with Brooks City Base for the use of the pad site and to use a small building (B514) in close proximity to the pad site. We installed the DI water panels in building 514. Figure 1.5, DI Water Panels, depicts this installation.



Figure 1.5, DI Water Panels

Lines from the DI panels run underground to the fuel cells to prevent freezing. Drains from the DI panels run to a small sump pump located adjacent to the building and then run to a nearby storm sewer drain. Water is provided by San Antonio Water System and is metered with a conventional water meter.

Throughout the installation process we have maintained good relations with the residences that will use the power and their neighbors. We have spoken with the public and distributed written information to those who requested it.

CPS and SwRI held numerous conversations with Plug Power to assure the smooth integration of the fuel cells into the CPS grid. CPS installed appropriate switches and signage to comply with electric code requirements.

2.0 POINTS OF CONTACT

Table 2.1 lists points of contact for the project. Many additional points of contact are contained in a larger spreadsheet available by contacting Alan Montemayor.

Table 2.1 Points of Contact

First Name	Surname	Organization	Specialty	Telephone	Email
Brian	Davenport	Plug Power Inc.	Fuel Cell Supplier	(518) 782-7700	brian_davenport@plugpower
Steven	Holt	Department of the Air Force	Brooks Systems	(210) 536-5015	Steven.holt@brooks.af.mil
Valerie	Harris	San Antonio City Public Service	CPS	(210) 353-3799	vvharris@cps-satx.com
Greg	Brady	St. Philips College	St. Philips Contact	(830) 537-5740	gbrady@gvvc.com
Alan	Montemayor	Southwest Research Institute	Project Manager	(210) 522-6940	amontemayor@swri.edu
Joe	Redfield	Southwest Research Institute	Fuel Cell Program Manager	(210) 522-3729	jredfield@swri.edu

3.0 CURRENT STATUS

As of January 30, 2003, all fuel cells and utilities are installed at the site. The fuel cells have been fully commissioned but lack updated control cards and software from Plug Power to bring the units online and enable data logging from the Connected Energy system. We estimate startup of the units on February 7, 2003.

We have a placeholder web site located at:

www.swri.org/fuelcell

We intend for this web site to be publicly accessible. The web site will describe the project, sponsor and participants, allow the user to click on the logos of the sponsor and participants and give the user access to real time data from the fuel cells at the Connected Energy web site.

We plan to hold a press event on February 18, 2003 at Brooks City Base Hanger 9 to showcase the inauguration of service. We are inviting approximately 200 people plus local press organizations. The invitations for the event should go out on or about February 3, 2003. Mr. Michael Binder from CERL is an invited speaker at the event and has indicated his willingness to attend.

If you have any questions, please feel free to call me at (210) 522-6940. My email address is amontemayor@SwRI.edu. For your convenience, my fax number is (210) 522-5720.

Reviewed by:

 for Scott T. McBroom

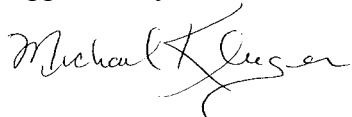
Scott T. McBroom, Manager
Advanced Vehicle Technology
Vehicle Systems Research Department

Sincerely,

 for Alan Montemayor

Alan Montemayor, Principal Engineer
Advanced Vehicle Technology
Vehicle Systems Research Department

Approved by:

 for Gary L. Stecklein

Gary L. Stecklein, Director
Vehicle Systems Research Department
Engine and Vehicle Research Division